

THE IMMATURE STAGES OF *CEPHRENES MOSELEYI* (BUTLER)
(LEPIDOPTERA: HESPERIIDAE) FROM TORRES STRAIT,
QUEENSLAND

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Abstract

The final instar larva and pupa of *Cephrenes moseleyi* (Butler) are described and illustrated from two specimens collected on Dauan Island, Torres Strait, Queensland and compared with the immature stages of *C. trichopepla* with which it occurs. Overall, on Dauan Island, larvae of *C. moseleyi* were encountered much less frequently than those of *C. trichopepla* (2:17). The host plant is *Cocos nucifera* Linnaeus (coconut palm), with juvenile palms found to be preferred by larvae of both *Cephrenes* species. The rearing of these two specimens from Dauan Island, together with another reared from Saibai Island in 2001, confirms the species' establishment in Australia.

Introduction

Cephrenes Waterhouse & Lyell is an Indo-Australian genus of skipper butterflies, with three species known from Australia (Braby 2000, Lambkin and Knight 2004). The larvae of the Australian species all feed on palms (Arecaceae) (Braby 2000, Lambkin and Knight 2004). Although predominately tropical, *C. trichopepla* (Lower) and *C. augiades* (C. Felder) are widespread along coastal Australia (Braby 2000), with *C. trichopepla* (Lower) also known from central Australia (Braby 2000). The invasion of these two species into new areas in recent years has been significantly aided by their accidental introductions on cultivated palms (Braby 2000). The third species, *C. moseleyi* (Butler) is known in Australia from only two islands in the northern sector of Torres Strait, Queensland (Lambkin and Knight 2004). Elsewhere, it occurs from the Moluccas, Aru and Kai Islands in Indonesia to New Britain and Bougainville, including mainland New Guinea and surrounding islands.

In Torres Strait, *Cephrenes trichopepla* occurs commonly, where it is known from almost all inhabited islands (unpublished data). In this region, larvae of *C. trichopepla* almost exclusively occur on *Cocos nucifera* Linnaeus (coconut palm). Oddly, despite its frequency in Torres Strait, Parsons (1998) found it uncommon on mainland New Guinea, but assumed that it was possibly widespread throughout much of the lowlands. Conversely, *C. augiades*, which in Torres Strait is only occasional locally and is much more rarely observed than *C. trichopepla*, is probably restricted to the islands in the lower half of the strait, namely Thursday, Prince of Wales, Moa and Badu (Mathew 1885, Waterhouse and Lyell 1914, Valentine and Johnson 1993, Braby 2000, collection records of A.I. Knight, T.A. Lambkin, C.G. Miller and G.B. Monteith).



Figs 1-7. *Cephrenes moseleyi* (Butler). (1-3) larval head capsule: (1) frontal view, width = 3.0 mm; (2) lateral view; (3) dorsal view. (4-5) final instar larva: (4) lateral view, length = 45 mm; (5) dorsal view, length = 43 mm. (6-7) pupa, length = 25 mm: (6) lateral view; (7) ventral view.

The life histories and larval hosts of *C. trichopepla* and *C. augiades* on the Australian mainland are well known (Dunn 1993, 1994, 1995, Lyons 1999, Braby 2000), including the final instar larval head capsule patterns, which are particularly diagnostic in identifying larvae of both species (Dunn 1993, Braby 2000). The mature larva and pupa of *C. moseleyi* were illustrated and briefly described by Parsons (1998), from material originating from Bulolo, Papua New Guinea.

During two field trips to Dauan Island, Torres Strait in 2004 and 2006, a number of *Cephrenes* larvae were collected from coconut and golden cane palms (*Dypsis lutescens* [H. Wendl.] H. Beentje & J. Dransfield) and reared to adults. The predominant species was found to be *C. trichopepla* (n = 17), with only two larvae of *C. moseleyi* collected. These two, together with a specimen reared from Saibai Island (Lambkin and Knight 2004), confirm its establishment in Australia. In this work, the final instar larva, head capsule and pupa of *C. moseleyi* are illustrated and described in detail for the first time from Australian material and compared with *C. trichopepla*.

Immature stages of *C. moseleyi*

Final instar larva (Figs 1-5). 43-45 mm long. Head capsule fawn in colour with a granulated surface and four conspicuous, reddish-brown to black vertical, almost parallel stripes consisting of a submedial and lateral stripe on each side of the head capsule joining at either side of the mandibles; frons with a short, centrally placed, thin brown vertical stripe immediately above mandibles. Body elongate, translucent, pale green to yellowish-green with a darker middorsal line extending from 4th abdominal segment to the anal plate; spiracles white, joined by a dull translucent white line; legs and prolegs, including bases, the same colour as body; anal plate granulated with prominent setae along its outer perimeter.

Pupa (Figs 6-7). 23-25 mm long; elongate and slender, variable in colour, pale yellow to yellowish-green; thorax and abdomen covered in short setae; wing cases pale with a distinctive brown enlarged thoracic spiracle at the base of each; a darker greenish-brown, trifid, projecting operculum covered with prominent setae; haustellum extending to 5th abdominal segment; tip of haustellum and antennae pale brown; cremaster rounded, with crenulate flange covered with posteriorly pointed spines.

Life history

The habits of the larva of *C. moseleyi* are similar to those of other *Cephrenes* spp. The larva constructs a silk-lined shelter on the host plant, in which it finally pupates. The surface of the pupa is covered in a light dusting of white, waxy powder. The three larvae of *C. moseleyi* encountered thus far in Australia, from Dauan and Saibai Islands (Lambkin and Knight 2004), were all collected from juvenile coconut palms growing in sand not far from the water's edge. In contrast, larvae of *C. trichopepla*, although found

exclusively on juvenile palms on Dauan, also occurred on coconut and golden cane palms away from the beach. Despite larvae of both species occurring on the same host species near the water's edge, it is not known whether they occur together on individual host plants. In general, adults of *C. moseleyi* were not often observed and, when observed, preferred to rest for long periods on or near their host plants (Lambkin and Knight 2004), as is the habit of the other two Australian *Cephrenes* spp (Dunn 1993, Lyons 1999). On Dauan, adults have also been collected from *Melaleuca* blossom.

Discussion

Final instar larvae of *C. moseleyi* and *C. trichopepla* closely resemble each other, but can be separated primarily by the different patterns on the head capsules. The pattern of vertical striping on the head capsule of *C. trichopepla* consists of two lateral black stripes, with two frontal black stripes running both sides of the frons, these stripes becoming laterally thicker just above the frons and thicker again closer to the mandibles. There is an orange-yellow patch on the cheeks either side of the mandibles at the base of the frontal stripes. Dunn (1993) provided very useful line drawings of the typical head pattern of both this species and *C. augiades*. The pattern of striping on the head capsule of *C. moseleyi* (Figs 1-3) is distinctly different from that of *C. trichopepla* and consists of two lateral and two frontal, almost parallel stripes which tend to be reddish-brown to black instead of the typical black stripes of *C. trichopepla*. There are no orange-yellow patches on the cheeks either side of the mandibles in *C. moseleyi*, with the two stripes either side of the head capsule joining at the base of the head. In addition, the ground colour of the head capsule of *C. moseleyi* is fawn while that of *C. trichopepla* is white. Larvae of *C. moseleyi* (Figs 4-5) are more elongate than those of *C. trichopepla*, are more yellow in colour and have the spiracles white rather than brown.

Pupae of the two species also differ. That of *C. moseleyi* (Figs 6-7) tends to be pale yellow to yellowish-green in colour, as opposed to the dirty-green to brown colour of *C. trichopepla*; it is also smoother in appearance than that of *C. trichopepla* and has a characteristic trifid, projecting operculum as opposed to the very dark, blunt and rounded operculum of *C. trichopepla*. The lengths of the haustella are also different (Parsons 1998), that of *C. moseleyi* extending to and just reaching the 5th abdominal segment while in *C. trichopepla* the haustellum reaches the 6th abdominal segment.

On Dauan, *C. moseleyi* is generally encountered less frequently than *C. trichopepla*. The collection of only two larvae of *C. moseleyi* during two field trips to Dauan, together with the paucity of adult Australian material known in collections (now about 10 specimens) attests to its overall rarity on Dauan and Saibai Islands. Parsons (1998) also reported the wide-ranging rarity of this species in Papua New Guinea but did indicate that it can be occasional locally.

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